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NOTICE OF ALLOWANCE AND FEE(S) DUE

20529 7590 10/06/2008

THE NATH LAW GROUP
112 South West Street
Alexandria, VA 22314

EXAMINER

BERNSHTEYN, MICHAEL

ART UNIT

PAPER NUMBER

1796

DATE MAILED: 10/06/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/508,748

02/07/2005

Giulio Alberti

26332

8351

TITLE OF INVENTION: INNOVATIVE METHOD FOR THE PREPARATION OF PROTON CONDUCTING NANOPOLYMERIC MEMBRANES FOR USE IN FUEL CELLS OR IN CATALYTIC MEMBRANE REACTORS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	01/06/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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P.O. Box 1450
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or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

20529 7590 10/06/2008

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Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/508,748 02/07/2005 Giulio Alberti 26332 8351

TITLE OF INVENTION: INNOVATIVE METHOD FOR THE PREPARATION OF PROTON CONDUCTING NANOPOLYMERIC MEMBRANES FOR USE IN FUEL CELLS OR IN CATALYTIC MEMBRANE REACTORS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional YES \$755 \$300 \$0 \$1055 01/06/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
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BERNSHTEYN, MICHAEL 1796 429-033000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 210 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 210 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/508,748	ALBERTI ET AL.	
	Examiner	Art Unit	
	MICHAEL M. BERNSHTEYN	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 08/06/2008.
2. ☒ The allowed claim(s) is/are 1-9,11-18 and 20-34.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____. |
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/Michael M. Bernshteyn/
Examiner, Art Unit 1796

DETAILED ACTION

1. This Office Action is a response to the remarks filed on August 6, 2008. Claims , 9, 11, 12-14, 16, 17, and 25-27 have been amended; no claims have been cancelled; claim 34 has been added.

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 6, 2008 has been entered.

3. In view of amendment(s) and remarks, the rejection of claims 1-9, 11-18 and 20-33 under 35 U.S.C. 112, 2nd paragraph, the rejection of claims 1-33 are rejected under 35 U.S.C. 102(a) as being anticipated by Bauer et al. (WO 03/077340 or U.S. Patent 7,108,935), the rejection of claims 1-6 under 35 U.S.C. 102(a) as being anticipated by Alberti et al. (U. S. Patent 5,892,080), and the rejection of claims 1-33 under 35 U.S.C. 102(b) as being anticipated by Grot et al. (U. S. Patent 5,919,583) have been withdrawn.

4. Claims 1-9, 11-18 and 20-34 are pending.

Allowable Subject Matter

5. Claims 1-9, 11-18 and 20-34 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the present claims are allowable over the closest references: Bauer et al. (WO 03/077340 or U.S. Patent 7,108,935), Alberti et al. (U. S. Patent 5,892,080), and Grot et al. (U. S. Patent 5,919,583).

Bauer discloses composite membrane materials comprising a polymer of the state of art uniformly filled with a zirconium phosphate, preferably α -zirconium phosphate or zirconium phosphate sulfoarylenphosphonate particles. The composite membrane materials are preferably prepared starting from a solution of a polymer of the state of art and from a colloidal dispersion of α -zirconium phosphate or a zirconium phosphate sulfoarylenphosphonate. The colloidal particles are transferred into the solution of the polymer preferably by mixing the dispersion with the solution or by means of phase transfer. The membrane material is preferably obtained by removing the solvent by evaporation or by a suitable non-solvent. Besides the composite membrane materials and the preparation methods, the use of the above membrane materials is claimed as ionomeric membranes with high overall performance in high temperature, especially hydrogen, and in indirect methanol fuel cells and with decreased methanol crossover in direct methanol fuel cells (abstract).

The preparation of a colloidal dispersion of (α -zirconium phosphate or of a proton conducting zirconium phosphate sulfoarylenphosphonate in a suitable solvent or mixture of solvents, and in the subsequent transfer of the colloidal particles into a solution of a polymer, especially an ionomer, of the state of art. The mixture thus obtained is cast on the surface of a smooth plane support and the solvent is removed by

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heating or by using a suitable non-solvent. Transfer of the colloidal particles into the polymer, especially ionomer, solution can be carried out (1) by mixing the polymer, especially the ionomer, solution with the colloidal dispersion or (2) by means of "phase transfer". It is possible to use noncharged polymers as conductivity is contributed by the zirconium phosphate. Preferably there are used ionomers, especially sulfonated polymers due to their conductivity at low temperatures ($<100^{\circ}\text{C.}$). There can be used perfluorosulfonic polymers, especially Nation, Hyflon or Sterion, sulfonated polyvinylidenefluoride, sulfonated polyetherketones, especially sPEK, sPEEK, sPEKK, sPPEK, sPEEKK or sPEKEKK, sulfonated polybenzimidazoles, sulfonated polysulfones sulfonated polyphenylsulfones and sulfonated polyethersulfones. In case (1) the same solvent can be used for the solution and the dispersion. Alternatively, if different solvents are used for the solution and the dispersion, it must be avoided that the solvent of the polymer may provoke colloid flocculation and the solvent of the colloidal dispersion may cause polymer precipitation (col. 3, line 58 through col. 4, line 18).

However, Bauer does not disclose or fairly suggest an organic precursor solution of a zirconium salt and phosphoric and sulfoarylenephosphoric acid containing chemical species of the zirconium phosphate sulfoarylenephosphate, which are converted into the final product only after the solvent evaporation, as per claim 1.

Alberti discloses solid mesoporous crystalline composition of diphosphonate-phosphite of a tetravalent metal, with a limited distribution of mesopores having the formula (abstract). The preferred oxychloride of a tetravalent metal is selected from zirconyl chloride octahydrate and zirconyl chloride monohydrate (col. 3, lines 50-52).

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Alberti discloses that the solvent can be water, or an organic solvent, or a mixed water/organic solventl preferably dioxane (col. 5, lines 22-25).

However, Alberti does not disclose or fairly suggest instantly claimed organic solutions containing metal (IV) salts and oxoacids of phosphorus which zirconium sulfoarylenephosphonate materials can be precipitated within the matrix of an ionomer so as to form a composite membrane, and the composition containining sulfoarylenemonophosphonate groups which confer a layered structure and protonic conductions.

Grot discloses cation exchange membranes, made from polymer having cation exchange groups and containing inorganic filler, exhibit reduced fuel crossover for fuel cells employing direct feed organic fuels such as methanol and, when inorganic proton conductor is employed, enhanced proton conductivity (abstract).

Grot discloses that zirconium hydrogen phosphate $Zn(HPO_4)_2$ can be precipitated in a membrane of perfluorinated sulfonic acid polymer (preferably in acid form) by soaking the membrane in an aqueous solution of containing zirconium ions, e.g., 1-5M zirconyl chloride, for a time and at a temperature sufficient to penetrate the membrane solution (col. 7, lines 8-15, example 1, col. 10, line 64 through col. 11, line 42). The cation exchange groups are preferably selected from the group consisting of sulfonate, carboxylate, phosphonate, imide, sulfonamide and sulfonamide groups (col. 3, lines 29-35). The membrane may optionally include a porous support for the purposes of improving mechanical properties, for decreasing cost and/or other reasons. The porous support of the membrane may be made from a wide range of components.

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The porous support of the present invention may be made from a hydrocarbon such as a polyolefin, e.g., polyethylene, polypropylene, polybutylene, copolymers of those materials, and the like. Perhalogenated polymers such as polychlorotrifluoroethylene may also be used. For resistance to thermal and chemical degradation, the support preferably is made of a highly fluorinated polymer, most preferably perfluorinated polymer (col. 5, lines 1-12).

However, Grot does not disclose or fairly suggest instantly claimed composite membrane, which is prepared by casting a solution of the perfluorinated sulfonic acid polymer and a solution containing the tetravalent metal and the phosphonic acids, wherein both the polymeric film and the inorganic filler are formed simultaneously during the evaporation of the solvent because Grot teaches the use of a preformed membrane.

6. As of the date of this Notice of Allowability, the Examiner has not located or identified any reference that can be used singularly or in combination with another reference including Bauer et al., Alberti et al. and Grot et al. to render the present invention anticipated or obvious to one of ordinary skill in the art.

7. In the light of the above discussion, it is evident as to why the present claims are patentable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delay, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reason for Allowance".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL M. BERNSHTEYN whose telephone number is (571)272-2411. The examiner can normally be reached on M-Th 8-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael M. Bernshteyn/
Examiner, Art Unit 1796

/M. M. B./
Examiner, Art Unit 1796

/Randy Gulakowski/
Supervisory Patent Examiner, Art Unit 1796

Application/Control Number: 10/508,748
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